

DEPARTMENT OF ECOLOGY

June 15, 2006

To: Sally Lawrence, Water Quality Program – Northwest Regional Office

From: Trevor Swanson, Environmental Assessment Program

Subject: **Samish Bay Fecal Coliform Bacteria TMDL Quarterly Progress Report #1
(February through May 2006)**

Project Tracker Code: 05-017

Introduction

Samish River, Samish Bay, Friday Creek, Thomas Creek, Edison Slough, and an unnamed slough to Samish Bay are on the Washington State Department of Ecology's (Ecology's) 2004 303(d) list for fecal coliform (FC) bacteria. Total Maximum Daily Load (TMDL) evaluations are required to identify the maximum amount of FC to be allowed into these waterbodies so as not to impair beneficial uses of the water. The TMDL is then used to determine the wasteload allocations among sources with wastewater and stormwater permits, and load allocations among various nonpoint sources that do not have permits.

This memorandum is the first in a series of five quarterly reports and summarizes project progress from February 2006 through May 2006. Data presented are provisional; data quality has not yet been checked.

Progress to Date

Data Collection

- Collected bi-monthly samples from the fixed network of stations (Table 1) for a total of eight membrane filtered FC samples from each fixed station (only six samples were taken from 03-ALI-GATE due to access issues).
- Split and analyzed 13 FC samples using the most probable number (FCMPN) method and membrane filtration (FCMF) method (Table 2). This will help assess MPN and MF method and result comparability between Ecology's data and the Department of Health's and Skagit County's data. Comparability will be assessed at the end of the 14 month project when more samples have been taken.

- Eighteen E. coli samples and 10 samples analyzing percent Klebsiella, Enterobacter, and Serratia were taken to ensure the FC was from warm blooded animals (Table 2). Results thus far indicate most, if not all, FC bacteria are coming from warm blooded animal sources.
- Budget constraints have recently restricted the number of FCMPN, E. coli, and %KES samples from 8, 15, and 8 every two months, respectively, to 5 every two months.
- No intensive rain event surveys were conducted due to the lack of consistent storms this spring. However, thunderstorms and rain sporadically moved through the watershed before and during the May 24 – 25 sampling survey. Results showed increased FC at all sites except 03-WED-GATE and 03-THO-00.3 during this survey (Table 1).
- Three sites not listed in the Quality Assurance Project Plan were sampled to investigate other possible sources of FC to the Samish River (Table 1). More investigatory samples may be taken to ensure other possible FC sources are not overlooked during the project.
- Streamflows were taken at most sites during bacteria sampling, including drains and sloughs to Samish Bay, to assess loading characteristics.
- Turbidity was measured once monthly and dissolved oxygen was measured twice monthly at all tributaries to Samish Bay. Results are not included in this report.
- Temperature was measured concurrently with FC.
- Coordinated with the Department of Health and sampled lower Samish Watershed on the same days they sampled Samish Bay.
- Investigated upper Thomas and Willard creeks, and upper Samish River (near Doran) for potential sites for further investigation into FC problems in these areas.
- 03-SMI-GATE was dropped from the site list because water never flowed from the tidegate during any of the eight surveys.

Data Results and Comparison to Washington Water Quality Standards

- We reviewed results for all FC samples collected from February through May. Preliminary data in tables and figures were compared to Washington State Water Quality Standards (WAC-173-201A).
- We detected violations of the geometric mean criterion at five sites and violations of the 90th percentile criterion at 12 sites (Table 1), although these violations may change or new violations may arise after more data is obtained.

Upcoming Tasks

The project team will continue tracking storms for rain event sampling.

A dye study is planned for early September for one to two reaches of the Samish River to determine travel time during low flow periods.

Ecology is measuring streamflow at tidegates and pump stations as often as possible; however, more data are needed to make reliable estimates of daily flow at these sites. Installing water pressure gages at selected stations and/or monitoring sites during a full tidal cycle to find out when and during what conditions pumps and tidegates release water may be necessary.

A synoptic sampling event is planned for the upper Samish River (above Doran) to assess possible sources of FC to the river. Four sites upstream of 03-SAM-28.8 will be sampled. Upper Thomas and Willard creeks will be sampled in a similar matter, also to assess possible upstream sources of FC.

Tables and Figures

Table 1. Fecal coliform (colony forming units per 100 mL) for all stations in the Samish Bay Watershed. Bolded values do not meet Washington State water quality criteria.

Field ID with River Mile	Site Location	Feb 7 - 8	Feb 21 - 22	Mar 14 - 15	Mar 28 - 29	Apr 11 - 12	Apr 25 - 26	May 9 - 10	May 24 - 25	geometric mean	90th percentile	% of samples that exceed 200cfu/100 mL
	Samish River											
03-SAM-00.7	At Bayview/ Edison Rd	36	31	11	65	27	14	2	120	23	82	0
03-SAM-04.6	Thomas Rd - Day 1	29	24	18	58	20	9	42	180	32	95	0
03-SAM-04.6	Thomas Rd - Day 2	32	35	13	34	44	60	51	290	46	129	13
03-SAM-06.5	Chuckanut Dr	28	32	11	19	31	40	60	250	37	117	13
03-SAM-10.3	Hwy 99	34	10	4	80	33	32	89	200	35	122	13
03-SAM-13.1	F&S Grade Rd	27	27	30	10	48	29	46	200	36	94	13
03-SAM-15.0	2nd Prairie Rd Crossing from Hwy 99	24	11	5	8	16	30	9	90	16	48	0
03-SAM-16.5	Off Prairie Rd	32	19	16	3	5	17	33	85	17	49	0
03-SAM-20.7	3rd Prairie Rd crossing from Hwy 99	4	1	24	1	14	1	9	45	5	30	0
03-SAM-22.0	Hwy 9	2	4	1	2	31	4	7	35	5	32	0
03-SAM-26.6	Wickersham Rd	1	1	2	1	2	8	14	92	4	37	0
03-SAM-28.8	Innis Ck Rd (in Doran)	280	310	1100	140	1200	2500	1100	1800	729	2010	88
	Samish River Tributaries											
03-ENN-00.0	Ennis Ck at mouth, Wickersham Rd	1	1	1	1	1	1	1	7	1	3	0
03-FRI-00.8	Friday Ck at Bow Hill / Prairie Rd (below Hatchery)	7	7	16	4	34	44	25	92	18	58	0
03-FRI-03.8	Friday Ck at 1st crossing downstream from Parson Rd on Fr. Ck. Rd	4	10	4	7	41	16	19	75	13	51	0
03-FRI-06.5	Friday Ck at Lake Samish Rd / Alger Cain Lk Rd	1	1	1	4	99	7	11	47	6	63	0
03-PAR-00.0	Parson Ck at confluence w/ Samish R	3	290	17	340	37	88	37	68	50	305	25
03-SIL-00.4	Silver Creek at Friday Ck Rd	7	6	2	2	5	17	19	25	7	21	0
03-SWE-00.0	Swede Ck at Grip Rd	45	43	9	99	260	34	16	230	52	239	25
03-THO-00.3	Thomas Ck at Old Hwy 99	8	150	77	49	37	67	160	84	59	153	0
03-THO-03.6	Thomas Ck off F&S Grade Rd abv. Willard Ck confluence	760	1100	71	470	1900	64	590	2600	518	2110	75
03-WIL-00.0	Willard Ck Off F&S Grade Rd abv. Thomas Ck confluence	220	71	140	140	240	120	250	340	172	277	50
	Samish Bay Tributaries											
03-COL-00.0	Colony Ck near mouth, just before tidegates	6	18	21	56	36	73	55	140	36	93	0
03-ALI-PUMP	Drainage to Alice Bay	30	49	120	29	40	29	41	96	47	103	0
03-NED-PUMP	N Edison drainage at Key Ave., off Smith Rd	27	300	44	180	190	69	36	230	96	251	25

03-SED-PUMP	S Edison drainage near liquor store	32	320	49	180	330	37	110	530	126	390	38
03-BAY-GATE	Drainage west of Samish River mouth, to Samish Bay	6	390	12	28	40	380	14	460	54	411	38
03-ALI-GATE	Drainage to Alice Bay		230		26	26	15	16	72	37	151	17
03-MCE-GATE	Tidegate to McElroy/Colony Slough	4	9	14	12	230	34	51	240	30	233	25
03-WED-GATE	W Edison drainage near Edison Slough mouth	20	32	1	2	3	65	160	80	15	104	0
03-EDI-01.2	Edison Slough just after tidegates in Edison	11	14	5	13	55	160	130	830	42	361	13
03-EDI-01.6	Edison Slough at private drive upstream of school	12	12	27	15	59	8	220	870	39	415	25
03-OYS-00.0	Oyster Ck near mouth (at lowest bridge by Taylor Shellfish Store)	2	1	1	11	1	1	4	17	2	13	0
	Investigatory Sites											
03-DRY-00.0	Dry Creek at mouth	7										
03-SKA-00.5	Skarrup Creek at first road crossing approx. 0.5 RM upstream				100	190	140	73	640	166	460	0
03-SAM-WF	Samish River "West Fork" (unnamed ck. by 03-SAM-28.8)							31		31		

Table 2. Fecal coliform membrane filtration method (FCMF), E. coli membrane filtration method (ECMF), fecal coliform most probable number method (FCMPN), and percent Klebsiella, Enterobacter, and Serratia (%KES) comparison table. Statistical comparisons have not yet been performed. Numbers are colony forming units per 100 mL or percent if %KES.

Field ID w/River Mile	Site Location	Feb 21 – 22			Mar 14		Apr 26			May 9	
		FCMF	ECMF	%KES	FCMF	FCMPN	FCMF	ECMF	%KES	FCMF	FCMPN
	Samish River										
03-SAM-00.7	At Bayview/ Edison Rd	31	19	0	11	23				2	33
03-SAM-13.1	F&S Grade Rd	27	27								
03-SAM-15.0	2nd Prairie Rd Crossing from Hwy 99						30		0		
03-SAM-22.0	Hwy 9	4		0			4		0		
03-SAM-26.6	Wickersham Rd						8	15	0		
03-SAM-28.8	Innis Ck Rd (in Doran)	310	250	0			2500	2900	23		
	Samish River Tributaries										
03-FRI-00.8	Friday Ck at Bow Hill / Prairie Rd (below Hatchery)	7	1	0							
03-THO-00.3	Thomas Ck at Old Hwy 99	150	140	0							
03-THO-03.6	Thomas Ck off F&S Grade Rd abv. Willard Ck confluence	1100	1100								
03-WIL-00.0	Willard Ck Off F&S Grade Rd abv. Thomas Ck confluence	71	43				120	140			
	Samish Bay Tributaries										
03-COL-00.0	Colony Ck near mouth, just before tidegates	18	24		21	22				55	33
03-ALI-PUMP	Drainage to Alice Bay	49	43	0	120	24					
03-NED-PUMP	N Edison drainage at Key Ave., off Smith Rd	300	100		44	33					
03-SED-PUMP	S Edison drainage near liquor store	320	260		49	33					
03-BAY-GATE	Drainage west of Samish River mouth, to Samish Bay				12	33					
03-WED-GATE	W Edison drainage near Edison Slough mouth	32	6		1	2				160	24
03-EDI-01.2	Edison Slough just after tidegates in Edison	14	12		5	13				130	920
03-EDI-01.6	Edison Slough at private drive upstream of school	12	6								
03-OYS-00.0	Oyster Ck near mouth (at lowest bridge by Taylor Shellfish Store)									4	2
	Investigatory Sites										
03-SKA-00.5	Skarrup Creek at first road crossing approx. 0.5 RM upstream						140	110			

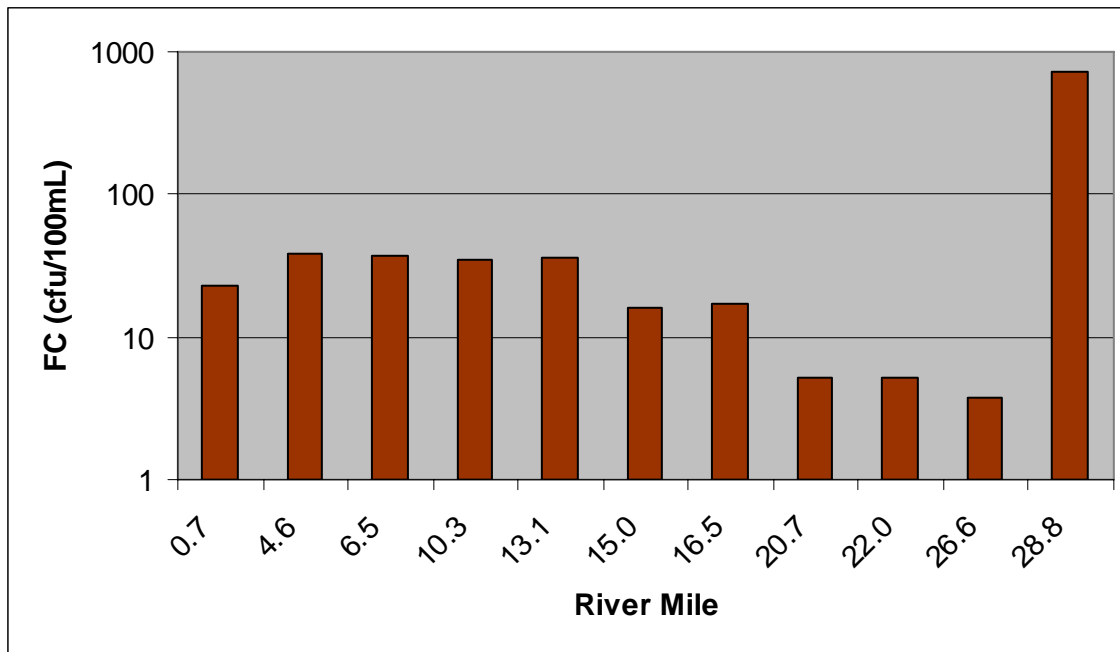


Figure 1. Mean longitudinal fecal coliform concentrations in the Samish River from February to May 2006. n = 8 samples per site.

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